

What is claimed is:

1. A method for obtaining a transduced population of viable cells by a retrovirus, comprising:

5 infecting the cells with a retrovirus in the presence of an effective immobilized amount of material including a ligand which binds to the cells and a ligand which binds to the retrovirus, so as to co-localize the retrovirus and the cells and increase the transduction efficiency of the cells, said infecting being conducted in a medium essentially free from hexadimethrine bromide.

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2. The method of claim 1 wherein the cells comprise hematopoietic stem cells.

15 3. A viable cellular population produced by the method of claim 1.

4. The viable cellular population of claim 3 which comprises hematopoietic stem cells.

20 5. A method for cellular grafting, comprising:

grafting a mammal with a viable cellular population produced by the method of claim 1.

25 6. A cellular composition, comprising:

a substantially retroviral-transduced population of viable cells, said composition being essentially free from both retroviral producer cells and hexadimethrine bromide.

7. The cellular composition of claim 6 wherein said viable cells comprise hematopoietic stem cells.

5 8. A method for cellular grafting, comprising:
grafting a mammal with a cellular population according to claim 6.

9. The method of claim 8 wherein the cellular population comprises hematopoietic stem cells.

10 10. A method for obtaining a transduced population of viable cells by a retrovirus, comprising:

15 infecting the cells with a retrovirus in the presence of an effective immobilized amount of material including a ligand which binds to the cells and a ligand which binds to the retrovirus, so as to co-localize the retrovirus and the cells and increase the transduction efficiency of the cells, said infecting being conducted in a medium essentially free from agents which increase the efficiency of transduction of the cells by the retrovirus in co-culture, but which agents reduce the efficiency of transduction of the cells by the retrovirus in the presence of said material..

20 11. A method for obtaining a transduced population of viable cells by a retrovirus, comprising:

infecting the cells with a retrovirus in the presence of a polypeptide including an amino acid sequence which binds the cells and an amino acid sequence from collagen V or fibroblast growth factor which binds the retrovirus.

25 12. The method of claim 11 wherein said infecting includes contacting the cells with the retrovirus in the absence of retroviral-producer cells.

13. A method for transducing T cells with a retrovirus, comprising infecting the cells with the retrovirus in the presence of a material including a ligand which binds to the T cells and a ligand which binds to the retrovirus, so as to co-localize the 5 retrovirus and the cells and increase the transduction efficiency of the cells.

14. The method of claim 13 wherein the material is a polypeptide including a first amino acid sequence which binds the T cells and a second amino acid sequence which binds the retrovirus, the second amino acid sequence having the sequence:

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Ala Ile Pro Ala Pro Thr Asp Leu Lys Phé Thr Gln Val Thr Pro Thr Ser Leu Ser Ala Gln Trp
Thr Pro Pro Asn Val Gln Leu Thr Gly Tyr Arg Val Arg Val Thr Pro Lys Glu Lys Thr Gly
Pro Met Lys Glu Ile Asn Leu Ala Pro Asp Ser Ser Val Val Val Ser Gly Leu Met Val
Ala Thr Lys Tyr Glu Val Ser Val Tyr Ala Leu Lys Asp Thr Leu Thr Ser Arg Pro Ala Gln
15 Gly Val Val Thr Thr Leu Glu Asn Val Ser Pro Pro Arg Arg Ala Arg Val Thr Asp Ala Thr
Glu Thr Thr Ile Thr Ile Ser Trp Arg Thr Lys Thr Glu Thr Ile Thr Gly Phe Gln Val Asp Ala
Val Pro Ala Asn Gly Gln Thr Pro Ile Gln Arg Thr Ile Sys Pro Asp Val Arg Ser Tyr Thr Ile
Thr Gly Leu Gln Pro Gly Thr Asp Tyr Lys Ile Tyr Leu Tyr Thr Leu Asn Asp Asn Ala Arg
Ser Ser Pro Val Val Ile Asp Ala Ser Thr Ala Ile Asp Ala Pro Ser Asn Leu Arg Phe Leu Ala
20 Thr Thr Pro Asn Ser Leu Leu Val Ser Trp Gln Pro Pro Arg Ala Arg Ile Thr Gly Tyr Ile Ile
Lys Tyr Glu Sys Pro Gly Sev Pro Pro Arg Glu Val Val Pro Arg Pro Arg Pro Gly Val Thr
Glu Ala Thr Ile Thr Gly Leu Glu Pro Gly Thr Glu Tyr Thr Ile Tyr Val Ile Ala Leu Lys Asn
Asn Gln Lys Ser Glu Pro Leu Ile Gly Arg Lys Lys Thr;

25 or a sufficiently similar amino acid sequence thereto to exhibit the ability to bind the retrovirus;

15. A method for localizing a retrovirus, comprising contacting the retrovirus with an effective amount of an isolated polypeptide having an amino acid sequence from collagen V or fibroblast growth factor which binds the retrovirus.